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A New Organization Welcomes Communication Men

The Association is non-profit making and membership is open to present and former members of the Armed Forces and civilians who are American citizens, and to all firms, companies, associations, and groups controlled by American citizens.

The provisional Constitution and By-Laws provide for the following classes of membership and dues:

a. Life Membership—$50.00.

b. Full Membership—$4.00 annually.

c. Group Membership—$100.00 annually. Open to all firms, companies, and associations interested in promoting the cause of industrial preparedness, particularly in connection with research, development, operation, production, manufacture, and supply of communication, electronic, motion picture, and photographic equipment. Group members have the privilege of nominating five (5) of their officials or employees who are American citizens to be full members in the Association without dues. For each member in excess of five (5) nominated by a group member, the annual dues are $4.00.

d. Student Membership—$2.00 annually. Open to all men and women who are students in technical courses in schools and colleges.

Members are entitled to the official publication of the Association, which will be published bi-monthly, and to such other publications as may be issued periodically.

It is planned to organize local chapters throughout the United States at places where there is a group large enough to organize and maintain such a chapter.

The Constitution will be subject to the approval of the membership and the officers and directors will be elected by letter ballot.

(Fill out and mail the application below)

ARMY SIGNAL ASSOCIATION

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Inclosed you will find $..... for national dues for membership.

Name .....

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City ..... State .....

Citizenship .....

(Full - $4.00 annual) (Student - $2.00 annual) (Life - $50.00)

Type of membership applied for

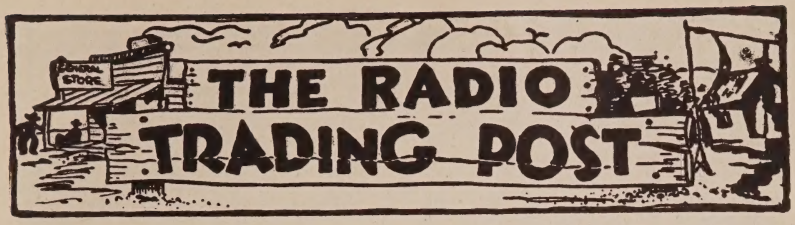
(N G) (Res) (A U S) (R A Act) (R A Ret) (Navy)

If you are now connected with the armed forces check component.

Present or Past Military Grade ..... Serial Number .....

Occupation or Type of Business ..... Title .....

Signature .....



A Free Market-Place for Buyers, Sellers, and Swappers.

These advertisements are listed FREE of charge to C-D readers so if there is anything you would like to buy or sell, if you wish to obtain a position or if you have a position to offer to C-D readers, just send in your ad.

These columns are open only to those who have a legitimate, WANTED, SELL or SWAP proposition to offer. The Cornell-Dubilier Electric Corp. reserves the right to edit advertisements submitted, and to refuse to run any which may be considered unsuitable. We shall endeavor to restrict the ads to legitimate offers but cannot assume any responsibility for the transaction involved.

Please limit your ad to a maximum of 40 words, including name and address. Advertisements will be run as promptly as space limitations permit.

FOR SALE — One SX-28-A Hallicrafters super Sky Rider receiver with speaker and cabinet in A-1 shape. Covers 55 to 43 megacycles, $250. M. J. Curley, 412 Forest Ave., W. Brighton, Staten Island 1, New York, N. Y.

FOR SALE—Precision 510H portable tube checker. Checks all tubes including miniatures and button types, $30. Solar dc to ac inverter, 100 watts, $20. Chester T. Martowicz, 116 East 7th St., New York 3, N. Y.

WANTED—Model 155 or 156 Hickok trace-meter. Also any other test equipment. P.D.Q. Radio Parts, 109 S. Second St., Rockford, Ill.

WANTED—"Radioag Dslowg" 26NG and WG38 O-18A tubes for German radio. Will pay reasonable price or trade. Information on above tubes will be appreciated. Harry Lipkin, 3 Smull Ave., Caldwell, N. J.

FOR SALE—Large quantity of tubes as a lot at less than cost. Tubes, any type singly at list. Shipped prepaid for cash or C.O.D. for a dollar deposit. Prompt refund if sold. Must sell complete stock. Also large lot parts for $100 or complete stock tubes, 96% new, and parts, $700 cash. Less than cost and all guaranteed. Edward Howell, Dillon, S. C.

FOR SALE—New tubes, nearly all numbers including acorn tubes. Also radio kits, ideal for beginners, includes midget tube, battery earphones, cabinet, and all parts necessary to build, $4.50 postpaid. Henry Lee, 495 Third Ave., New York 16, N. Y.

WILL SWAP—Latest NRI course on Radio and Television for photo enlarger or 8 mm projector. All offers considered. S. J. Radwanski, 1536 S. Spaulding Ave., Chicago 23, Illinois.

FOR SALE—Univex 35mm camera, 4.5 lens, built-in exposure meter, including rangefinder, flashgun and case, $28. Walter Baer, 329 N. Duke St., Lancaster, Pa.

FOR SALE—Rider's 11, 12, 13, 14. RCP model 805 tube and set tester, Superior model 450 tube checker. All items new. $149 takes lot. Also sold separate. J. R. Fisher, 528 Weaver St., Greensburg, Pa.

WANTED—Your name and address on a penny postcard will place you on our mailing list for bargain offers of electronic equipment. Gifts 'n' Gadgets, 518 Hilton Ave., Catonsville 28, Md.

FOR SALE—Hanlan appliance tester, new, complete, $9.75. E-200 Precision signal generator, new, $49.21. Pesiri Radio Service, 29-23 Jordan St., Bayside West, Long Island, N. Y.

FOR SALE—Superior model PB-200 VOM with following ranges: ac and dc volts to 1500. DC current to 1.5 amps. Ohmmeter to 2 meg. ohms. Capacity to 30 mfd. Decibels from minus 10 to plus 58 Price $30 prepaid. Also have DeForest's training manuals in radio, sound and television, $15; "Aeronautic Radio" by Myron F. Eddy, $2.50; "Understanding Radio" by Watson, Welch and Eby, $2.50; and "Elements of Radio" in 2 volumes, $3. Greene Radio Service, 21201 Audette Ave., Dearborn, Mich.

FOR SALE—Foreign tubes. $50 for the lot or $3 each and 15 cents each for lamps. Send for list. Anthony G. Hanss, 26 Brentwood St., Rochester 10, N. Y.

FOR SALE OR TRADE—Recording head, arm, and gear assembly, etc., for 1941 beam-of-light Philco record changer. Have also old type thick Edison Graphone records. Make offer. Rural Radio Service, R. D. 1, York, Pa.

FOR SALE—Tube tester, no. 450, same as new in suitcase-type case with easy to read chart. Price $30. Wm. E. Bruner, Garfield, Ky.

FOR SALE—50 transmitting tuning condensers, 60 B.W. coils, crystals, meters, transformers, plate, modulation and filament. The Radio Laboratory, 912 West 151st St., East Chicago, Ill.

ATTENTION—Radio distributors. I have a mailing list of 75,000 names with full addressing machine facilities. List comprises cash and charge customers of expensive gift store. If you have a good item to sell, contact me. G. Samkofsky, 527 Bedford Ave., Brooklyn 11, N. Y.

WILL SWAP—Stevens No. 416 target rifle, like new, sling, Vaver micrometer rear sight, Vaver front sight No. 1175 with light filter disks and four aperatures, for instructograph and practice tapes, in good condition. John S. Ciach, 1006 Brown St., Willmington 21, Del.

FOR SALE—Reconditioned table model Pilot radio chassis, No. 55, price $10. 40% discount brand new radio tubes. Send for list. Gus Scuto Reliable Radio Specialist, 25 Newbury St., Lawrence, Mass.

FOR SALE—New 1947 table model 5 tube superhet, beautiful walnut cabinets, $21 ppd. Satisfaction assured. Deduct 10% in lots of three. Terms cash or 25% cash, balance C.O.D. James T. Moore, Route 5, Union, S. C.

FOR SALE OR TRADE—5 meter transmitter, dynamotor, neon transformer, motor, aircraft type switches, hi-low impedance headphone adapters, control boxes, tubes 2 television tuning units-airpadders, 4" P.M. speaker, tube base indicator, also others. Sell all but transmitter and tubes for $25. Write for description. Elem Allen, Jackson, Ala.

WILL SELL OR TRADE—I have 30 records averaging 20-25 years old, collector's items, all types. Maybe I have the one you are looking for. Send for list. Robert Young, 4104 Ave. J, Brooklyn 10, N. Y.

WANTED — Transmitter or transceivers, used but in good condition with tubes. This must be ready to use on 110 volts ac. Just plug it in. Mr. Stanley Katz, 1050 Longfellow Ave., Bronx, N. Y.

FOR SALE—Natural wood record-playing needles. Similar to cactus needles. 25 cents per dozen. Edward Diskavich, 154 E. Main St., Torrington, Conn.

FOR SALE OR SWAP—Tru-Fidelity 10 watt amplifier with VTC input and output linear line transformers, using 6A3 tubes, with dual tone controls and volume expansion. Separate power supply plate, voltage and bias voltage. Will sell or swap for a good camera such as Rollieflex, Leica or Contax. Albert Seligson, 512 E. Thompson St., Piladelphia 25, Pa.

WILL TRADE—New 833, 810, 828, xtal and dynamic record player, for dual speed 16" transcription turntable. Llewellyn Jones, Jr., 1412 W. Arch St., Shamokin, Pa.

WANTED—Outmoded or inoperative table model television receiver similar to Andrea, etc. Send details. All letters answered. Joseph Jancer, 1483 Longfellow Ave., Bronx 60, N. Y.

FOR SALE—Signal generator, model A100 made by A.E.I. Co. Also kodak model 70 projector, kodak model 25 camera, G.E. model II 58DW exposure meter filters, titlers and photoflood lamps. Send for information on any one of these. Best cash offer accepted. Salvatore Lonigro, 52 Willowdale Ave., Montclair, N. J.

FOR SALE—Brand new BC342N receivers, $85, new HRO $225, BC654 complete with xmtr-rcvr, $50. Ship-shore radiophones, handie talkies, Hallicrafters S19 rcvr, voltohmeter, small tube tester and coax cable. B. C. Higley, 712 Bergen Ave., Linden, N. J.

FOR SALE—L. L. Cooke Electrical Course, 75 lessons, $18. 8 vols. McGraw-Hill Practical Electricity, $17. 7 vols. Power Plant Operation, $15. 7 vols. Hawkins Electrical Guides, $3.50. Ed Tischler, 56 Carey Ave., Wilkes-Barre, Pa.

FOR SALE—New Superior tube tester, model 450, also CA10 signal tracer, $45. Carl Mattson, RFD 1, Box 110, Tronwood, Michigan.

FOR SALE—Scopes, 2"-3" and Dumont 5" model 208B new, F-M tuning units, phono motors, 12" PM speakers, and all types of tubes, regular discounts. Radio Supply Co., 148 York St., New Haven 11, Conn.

WANTED—Copy of volume six, Rider's manual, used. State condition and your price. J. A. Dixon and Son, 324 Oakwood Ave., Marietta, Ohio.

WANTED—QST 1937, 1938 and Jan. through July, 1939. Write giving price and description. Edgar Newman, 214 Munro Blvd., Valley Stream, N. Y.

(Continued on page 12)

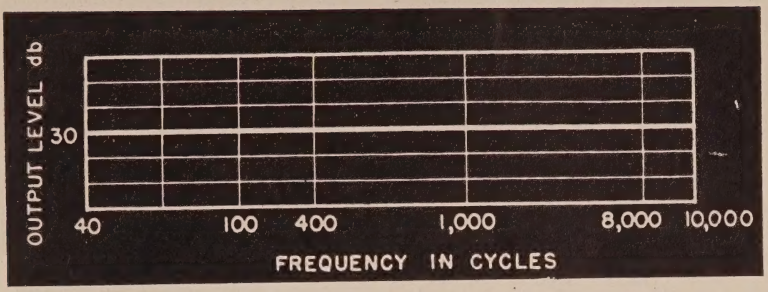


Fig. 1. Typical response curve of a high-fidelity amplifier.

AUDIO AMPLIFIER EQUALIZATION METHODS*

Equalization of audio-amplifier systems may be required to correct frequency response for deficiencies in a loudspeaker, baffle, mike, phono pickup, radio tuner or for the acoustic qualities of a building. The theoretically ideal frequency-response curve of an amplifier is one which is perfectly flat, but this is only a starting point. The shape of the curve must be altered to fit the installation conditions and the characteristics of associated equipment.

Tone Controls

The altering of the response curve of the amplifier is usually accomplished through the use of tone controls. The treble or bass response may be picked up in this way. To illustrate this point, suppose that we have an amplifier with a response such as that in Fig. 1, and a mike with a response equivalent to that in Fig. 2. The amplifier response is perfectly flat over the 40- to 10,000-cycle range, which is possible with the finest modern equipment. The mike, however, is down 2 db at 50 cycles and 4 db at 40 cycles. Also, the mike response is down 1 db at 8,000 and 4 db at 10,000. In many systems, exceptionally good high-frequency response would not be necessary but in a high

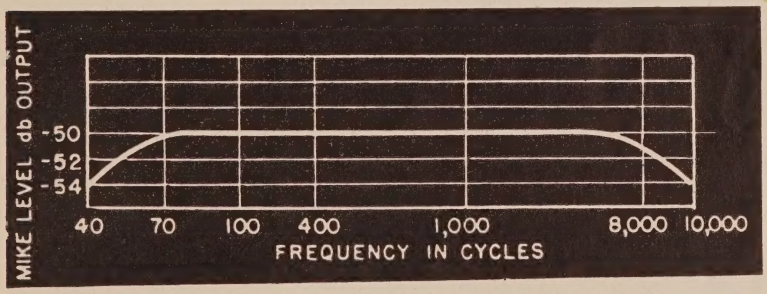


Fig. 2. Response of a microphone 1 db down at 8000 cycles and 4 db down at 10,000 cycles.

* *By Willard Moody in "Service."*

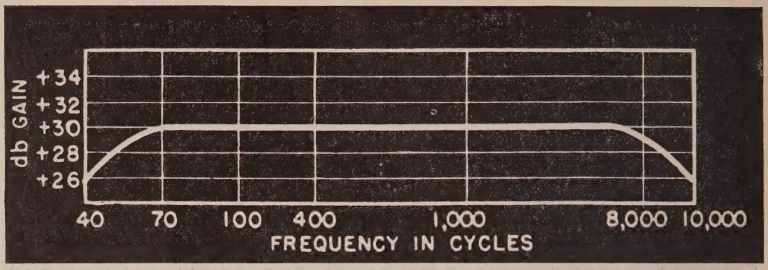


Fig. 3. Overall response curve of microphone and amplifier.

fidelity type of installation it would be required. Assuming the over-all curve is to be flat from 40 to 10,000 cycles, we can boost the amplifier gain as shown in Fig. 4.

On the assumption that the mike level is —50 db below .006 watt standard reference level, at 400 cycles (a standard test frequency) and the amplifier output is to be +30 db above .006 watt, the gain in the amplifier required to give +30 db output with a —50 db mike would be 80 db. This gain is constant over the range for a given constant input signal and the rated output of +30 db. Therefore, if the mike power output drops off and is down 4 db at 40 cycles and 10,000 cycles, the amplifier without equalization will have an output of 30 — 4 or 26 db as shown in Fig. 3. Using equalization, the output of the amplifier is maintained constant at +30 db, but the gain is varied. This gain variation occurs at a definite rate, according to the slope of the curve between 70 and 40, and between 7,000 and 10,000 cycles.

The amplifier requires the —50 db input level to give full +30 db output power. In view of this and the fact that the amplifier gain is constant for a given volume-control and tone-control setting, a pre-amplifier with the desired frequency response characteristic may be used, or in many cases we can simply adjust the tone and gain controls on the main amplifier to equalize the output. There is, however, a practical limit to this procedure. For best results, a reasonably strong input signal should be supplied to the amplifier input to keep hum and noise down. By using a conservatively rated amplifier, one capable of giving an output of +35 db, at —50 db input, less strain will be placed on the

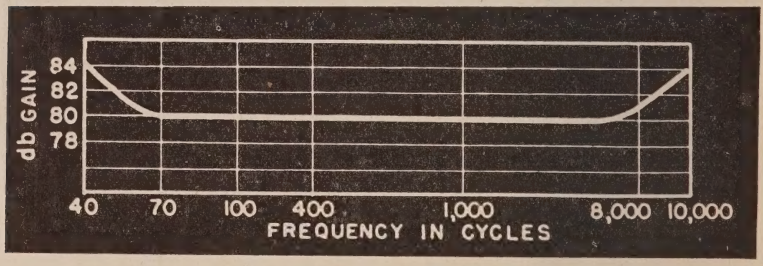


Fig. 4. Equalized amplifier-response curve.

amplifier system. As a matter of fact, sometimes less emphasis than it deserves is placed on the idea of conservative rating since the amplifier and general system efficiency tends to decrease somewhat with age, causing loss of output.

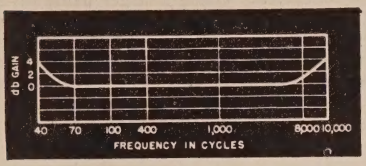


Fig. 5. Preamplifier gain characteristic for overall equalization.

Pre-Amplifier Gain

The pre-amplifier for the foregoing application should have a zero gain from 70 to 7,000 cycles, and a gradual rise in gain from 70 to 40 and from 7,000 to 10,000 cycles. The required responsive curve is shown in Fig. 5. By increasing the response at the low and high ends of the band, using an arrangement such as that in Fig. 6, the ideal responsive curve of Fig. 5 may be approached. VT_1 serves as a low-frequency amplifier. The purpose of R_1 is to prevent shorting the mike input by means of C_1 which bypasses the highs. The relative gain can be controlled by the choice of tube, operating voltages and the resistance and capacitance values. The Service Man may experiment with various values for a particular job and needed gain.

Crystal Mike Use

A crystal, high-impedance mike working into a high-impedance amplifier input circuit may be used, if the circuit of Fig. 6 is employed. VT_2 is a high frequency amplifier. C_3 is made relatively small in value, perhaps .001 to .005, and R_5 may be about 250,000 to 2 megohms. R_6 may be about 500,000 ohms with the other values experimentally determined. The action is to permit the high-frequency current to flow in C_3 and R_6. This current flowing in R_6 develops a high-frequency audio voltage across the grid resistor to drive the grid of VT_2. The amount of low-frequency voltage is small, since the reactance of C_3 at low frequencies is high, and R_5 is in opposition to the flow of high-frequency and low-frequency current. This opposition is bypassed by C_3 for highs but not for lows.

High-Frequency Boosters

A very common trouble is that the high-frequency response of a mike drops off due to the use of a relatively long line and the shunt capacitance effect of the line. By shunting the amplifier input with a parallel L-C resonant circuit, the high frequency level can be boosted; Fig. 7. The line impedance is in series with the mike. If there is a voltage drop along this impedance, the voltage at the amplifier input will be smaller by the amount of the drop. The mike, line, and amplifier-input impedances form a voltage divider. By making the mike-input circuit a low-impedance type, running a 50- to 500-ohm line and using coupling transformers, the line loss at high frequencies may be reduced, but the

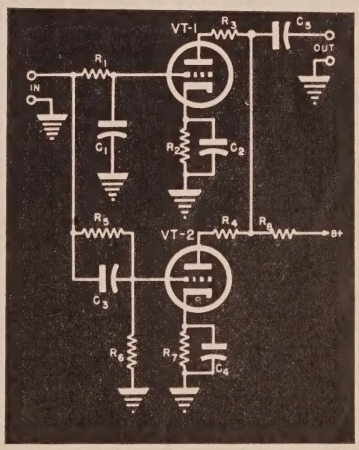


Fig. 6. Preamplifier for equalizing; VT-1 is a low-frequency amplifier and VT-2 is a high-frequency amplifier.

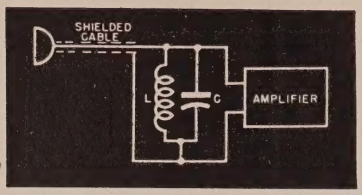


Fig. 7. Boosting high-frequency level by shunting amplifier input with a parallel L-C resonant circuit.

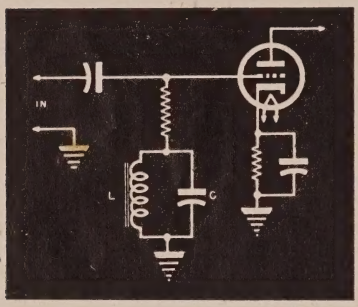


Fig. 8. Boosting low-frequency region with a parallel L-C resonant circuit. L and C are resonant at 80 or 100 cps or some point desired in the low range of the audio band for bass boost.

transformers themselves, unless of good quality, may introduce resonances and cause non-linear response. By using the L-C equalizer circuit, better results may be obtained under certain conditions. The amplifier input capacity is shunted by L and adds to C. Therefore, the frequency of resonance of L-C may be made slightly greater than the top frequency in the range, for example 12,000 cycles if the top is 10,000. The L-C circuit will tend to boost the signal voltage in frequency of resonance. The values may be found experimentally.

Another common trouble is the lack of low-frequency bass response. In many cases this may be due to using an amplifier which does not have the necessary power output to handle low-frequency notes. Adequate reproduction of low notes requires more power than equivalent level high notes. By using better loudspeakers, such as those made with Alnico V magnets in the p-m cone and p-m driver units, better conversion efficiency and more sound output for a given electrical input may be obtained. Using a larger baffle on a cone dynamic or a suitable projector horn, low-frequency response may be improved without applying amplifier equalization.

Low-Frequency Boosters

Where a boost in the low-frequency region is required, a parallel L-C resonant circuit, as shown in Fig. 8, may be used. The tube may be one of the voltage amplifiers in the main amplifier or in a pre-amplifier. The L-C combination may be installed in a plate circuit, as shown in Fig. 9. If a peak is desired at 100 cycles, the L-C com-

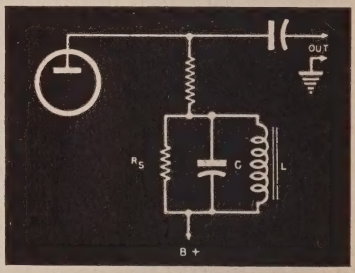


Fig. 9. L-C combination in plate circuit for low-frequency response boost. Rs is a shunt for controlling the magnitude of boost.

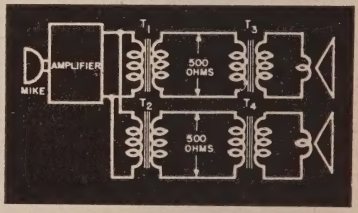


Fig. 10. Setup for two p-m drivers to carry low and medium-frequency power.

bination is selected to resonate at this frequency. To control the bass-boosting effect, the L-C combination may be shunted with a resistance whose value is determined experimentally. Values of 1 megohm to 10,000 ohms may be tried.

Loudspeaker Setups

When the loudspeakers used with the system prove inefficient at high audio frequencies, and the mike or other pickup tends to drop off slightly on the highs, they may be picked up by using a small pre-amplifier with a reduced value of coupling capacitance. Ordinarily, a .01 or .05 mfd-coupling capacitor would be used. By using a smaller value of .006 or .005, the higher frequencies will receive greater emphasis. Even smaller values down to .001 may be used in some cases, the best being determined experimentally. If necessary, tweeter loudspeakers may be added to the system to bring up the high frequency output. Some loudspeakers may be very poor on the highs, even though considerable high-frequency power is fed into them. Using the tweeters, the regular speakers will carry the major part of the sound but reinforcement of the highs with an improvement in fidelity and equalization will be obtained. Standard units of this type have 15-ohm voice coils, but other impedance values may be obtained.

Tweeters and L-Pads

Suppose, as an illustration, that the system uses two p-m drivers at 10 watts each, to carry low- and medium-frequency power, and the amplifier is coupled to the speakers using 500-ohm lines. We then have the arrangement in Fig. 10. If we add two tweeters, we may use the arrangement in Fig. 11. L pads may be used at each tweeter to control the power levels and prevent overloading and rattling. Impedances should be matched.

Preventing L-F Power Leaks

To prevent low-frequency power being fed into the tweeters, a series capacitor may be connected in each tweeter voice-coil circuit. Values used may range from 1 or 2 mfd to 8 to 16 mfd. Electrolytics can be used. As an alternative, where the powers are not higher than about 15 watts input to each loudspeaker, a coaxial type speaker, which has a wide range, can be used. Such loudspeakers, or equivalent, may be used as replacements for older types having limited fidelity.

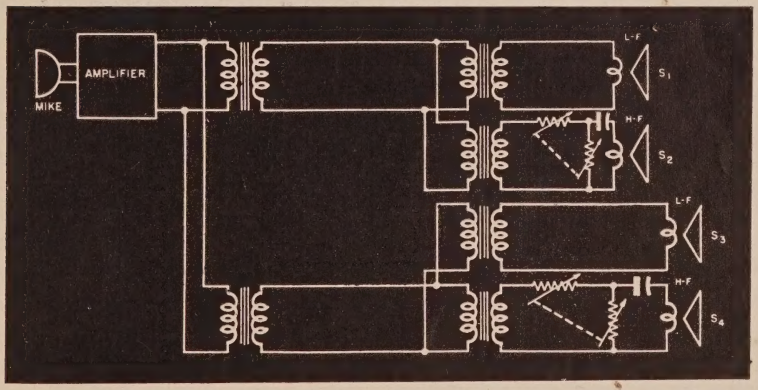


Fig. 11. Combination low-frequency and high-frequency reinforcement system.

RECORD CHANGER SPEED FAULTS*

Practical Repair Tips on Specific Turntable Motors
Important Pointers to Guide Your Player Servicing

Neither layman nor radio technician need to be reminded of the importance of constant, normal speed in the rotation of the phonograph turntable. A run down or wowing phonograph is material for a comedian and not for enjoyable record reproduction. However while a bad case of wow or improper speed is apparent to everyone, many cases of complaints of excessive high frequency response, generally termed shrillness by the consumer, are the result of excess speed and not deficient audio design.

Considering price and volume production, the modern rim drive motor is relatively trouble free. This motor is not a new development. It was used for years in disk recording machines and was most successful under the strains encountered in cutting blanks. However this does not mean that service problems do not arise in such units.

The General Electric rim drive motor is one of three types to be discussed now. This unit has been used in many record changers, and is generally mounted in a cradle, insulated from the rest of the equipment by two rubber bushings on the mounting flanges.

The removal of this motor from its mounting requires no instructions, but is apparent on inspection. For service, remove the motor from its mount and take out the two slide screws that hold down the shell. Pull out the spindle. Examine the bottom of the spindle and its retention bearing.

If the unit has been in operation for some years it will be found to be dry. Clean the spindle with carbon tet and dry. It is even advisable to wash out the interior of the retaining bearing and dry the same. Lubricate the interior with about twenty drops of light machine oil, then force the spindle down into the motor so that the overflow oil will flow into the retaining well.

How to Free Rotor

Try spinning the rotor by hand. It should turn freely. If it does not, loosen the two remaining screws that hold down the armature assembly. Insert four shims between the rotor and the armature walls. Generally .005 speaker shims will do. Tap the armature and rotate the rotor slightly. When you think that you have centered the assembly tighten the screws.

Difficulty is seldom encountered in aligning the armature and the motor should now start and operate efficiently. Of course it is assumed here that the unit has been checked for continuity with an ohmmeter against an open winding. If windings are continuous, and the motor still does not operate at all, substitute a 1mfd capacitor for the original unit and see if the motor starts.

The author has seen many a motor assembly with open capacitors. There were even two cases where the condenser was dead shorted. However this is a rarity as the working voltage is low for the quality capacitor employed. The exact value of the capacitor is 1.1 or 1.2 mfd.

Should a check show that the windings are open, do not throw away this unit until you have removed the shell and checked the internal connections at the terminal board. Most servicers have seen several of these units with corroded, broken, or even cold soldered joints, all easily repaired.

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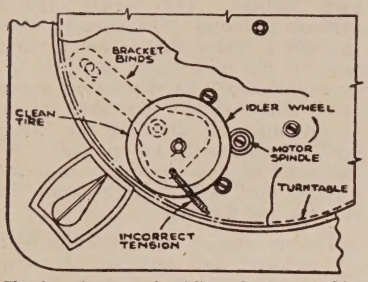
* *By Louis Loshak in "Radio and Television Retailing."*

The next source of trouble in these motors will be found in the drive tire, or tires if an idling wheel is used.



Check points on the idler plate assembly.

These tires rotate around a bearing and are fastened down by means of a C washer. Remove the tire and examine. If it looks worn or is flat, replace it.

The Right Lubricants

Lubricate the bearing that the wheel goes on with petroleum jelly or light grease. Wash the motor spindle, tires, and the inside wall of the turntable with carbon tet. The turntable speed should now be stroboscoped. It should read 78 revolutions with at least five records and the pickup arm on the turntable.

Look for binds and poor tension springs if speed is not correct. Do not scrap a motor or run out to buy a new one simply because proper speed is not attained. This unit if properly serviced rarely goes bad and generally shows no wear at all.

When you do have to replace one of these motors, it is good practice to save the old unit. Parts from two or more of these motors can be combined to build a new and satisfactory unit.

There are motors of course which do not employ a capacitor and service problems are generally limited. Lubricate the top and bottom bearings or oil wicks and look for trouble in the associated drive equipment. This means the tires, bearings for the tires and especially springs.

On units produced just prior to the war, tires prove to be especially bad actors. Flats may develop when the mechanism is left idle for a few months particularly during warm weather. A quick repair of a drive tire can sometimes be effected by turning it inside out and smoothing it down with light sandpaper while the motor is sunning. However with parts now readily obtainable such economy is hardly justifiable.

On some model motor drives, the tire assembly is mounted on a platform. When the spring is loose or dead, or when a bind develops between the platform and the motor board, chatter or slow speed may be the result. Some production models have a screw that limits the action of the platform. Dirt and caked oil result in a bind that arrests the free play of the platform. Simply loosening the screw without cleaning and freeing this assembly will result in intermittent operation and chatter.

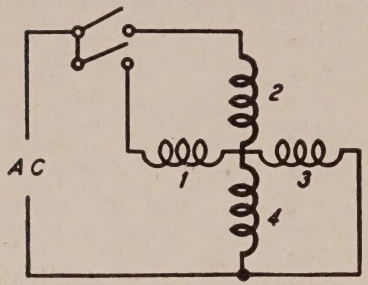
Also since these units chatter, you must look out for oil and grease poured in by well meaning consumers who tinker with their machines before calling in the servicer. Webster three post changers built immediately prior to the war seem to suffer most with the tire complaint. If you service many of these machines it will be worth your while to stock a few tires so as to save time.

Then there is the Alliance rim drive motor. These are used in a host of changers as well as in a great many record players of all types. Service problems on these units are generally limited to the drive equipment, such as tires, springs, etc. However there are several service hints in regard to the motor proper worth passing on.

Check These Troubles

Early models had felt washers top and bottom; these should be lubricated thoroughly. Then again, after a unit has been in operation for some years, the bearings often become caked with dirt and hardened grease. Drop the motor from its mounting and wash it out with carbon tet or benzine. Dry and lubricate. After

a time the rubber tire softens up and deposits of rubber form on the motor spindle. This deposit should be scraped off, the spindle washed and the tire replaced.



For correct starting, inductance of windings 1 and 3 are less than 2 and 4.

Manufacturers of replacement service parts put out an assortment of drive tires which every service shop should buy. One tire that you may use for one repair will make the whole kit a good investment. Another source of trouble on the Alliance assembly is the spring. This may go dead in time or become stretched and should be replaced.

Another good investment is to procure a couple of Alliance general replacement motors such as are sold by parts jobbers. The prewar type is particularly useful. Occasionally when you get a motor that is too troublesome or has been burnt out, you can do a quick repair by substituting a new unit. Although the mounting spacers or bushings are different the motor itself is almost always similar. All that need be done is to exchange the spacers, nuts, and bolts between the old unit and the new.

This procedure is worthwhile both for customer and servicer. It saves the consumer weeks of waiting until the servicer receives an original replacement from the changer manufacturer and it expedites delivery and receipts. Remember, that unfinished work on your shelves cannot be exchanged for groceries. Twenty-five dollars invested in rubber tires, motors, an assortment of springs and some hardware can speed up turnover. With labor at its present high level, the servicer can employ his time to more profitable advantage than running around looking for small parts.

(To be continued)

THE RADIO TRADING POST

(Continued from page 4)

FOR SALE—Radio tubes in cartons, new all types, any quantity. Discount varies depending on quantity purchased as per last OPA schedule. John Magnus, 9415 So. 55th Ave., Oak Lawn, Ill.

FOR SALE—Scarce radio tubes, all types. 1LA6, 43, 47, 50Y6, 50A5, 7A8, 7B7, 2A5, 1LN5, 25Z5, 57, 71A, 12A8, 32L7, 6F5, etc. Good discounts, free catalog. Commercial Radio, 36 Brattle St., Boston 8, Mass.

WANTED—A 1280 model tube checker and tester combination, Superior. Reasonable and cash deal. W. J. Bouchard, 105 Cornelia St., Brooklyn 21, N. Y.

EXCHANGE—Approved Model A 100 signal generator, brand new, for a used Hallicrafters model SX-25 communications receiver with or without speaker (even trade). Merwin G. Rinde, 630 West Cook, Portage, Wis.

FOR SALE—Complete radio shop with 270 tubes, Rider's manuals 2 to 6, precision generator F-200, tube tester, condensers, resistors, adaptors and other parts and books that go with a shop. Make offer, must sell at once. Frank Russell, Box 162, Quinton, Okla.

FOR SALE OR TRADE—Hi-Fi 35 watt amplifier, transmitting and receiving parts, all types tubes, meters. Am interested in field glasses, .22 cal. rifle and good signal generator. Marvin Radio, 14 E. 208th St., Bronx 67, N. Y.

SELL OR SWAP—Stromberg-Carlson model 846 walnut console radio, ATR, dc-ac inverter model RHA, output 110v, 50-60 cycle, capacity 325 watts. Interested in photographic equipment, candid camera, Weston or GE exposure meter for movie, enlarger, etc. Ralph A. Gans, 1418 Carroll St., Brooklyn 13, N. Y.

FOR SALE—2¾" 90 degree prisms out of aircraft sighting devices. No chips. $15 each. R. Cram, 2200 Logan Ave., Des Moines, Iowa.

FOR SALE—Hallicrafters S-36A receiver, perfect condition; RCA AR88LF communications receiver, perfect, $125 each f.o.b. Need signal generator. All inquiries answered. L. E. Jones, Box 902, Pocatello, Idaho.

TRADE—Have interoffice units, mandolin, tone control units, Crosley Fiver, two band receiver, Air King portable radio, antique Grebe radio, photo items, 76 assorted radio magazines, gift merchandise. Want Kodak, Revere, Bell and Howell, etc., 8 mm projector. Must be in new or perfect condition. Also want 8 mm feature film. Will trade for radio items, or other merchandise, or cash. G. Samkofsky, 527 Bedford Ave., Brooklyn, N. Y.

SALE OR TRADE—Four speakers, seven small transformers, condensers, resistors, and three books on radio. I would like to hear from someone having a volt-ohm-milliammeter tester in A1 condition. State what you want. William Tyler, Jr., 22 John St., Tarrytown, N. Y.

FOR SALE—1941 Ford radio, dash mounted guaranteed against any defect. Price including postage, $32.50. Six tube ac-dc radio sets. Electronic brand. Use one 12SA7, 12SQ7, two 12SK7, one 35Z5, one 50L6. Beautiful wood cabinet. Slide rule dial. Loop aerial, immediate delivery. Sets built with C-D capacitor. Price $30. Snyder's Radio Service, Box 271, Keiser, Pennsylvania.

FOR SALE—Hickok VOM model 4900-S for $27.50. AC-DC volts 0-2500 on 5 ranges, at 1000 ohms per volt. AC-DC MA 0-500 on 3 ranges. Ohms 0-10 meg. on 5 ranges. Zero current VM 0-250 on 3 ranges. Mfd's .0001 up. Adam W. Miller, First St., Neason Hill, Meadville, Pa.

SELL OR TRADE—Two Chicago instrument model 431 pocket volt-ohm-milliammeters (one new). Complete with instructions and test leads. Also Beede 0-1 milliammeter. Need PA speaker, signal generator or what have you? Tom Erwin, 3735 Milwaukee, Chicago 41, Ill.

FOR SALE—Rider's radio service manuals, volumes one to thirteen inclusive. Price $100. Good as new. M. D. Banta, 541 Flower St., Turlock, Calif.

FOR SALE—Radio servicing business, complete. Tubes, parts, supplies, test equipment. 45% off OPA list on tubes, 80% off parts and supplies at 1943 prices. Reasonable discount on test equipment. Buyer must take all or nothing. Approximately $1,000 will cover. For information write to P.O. Box 15, Lebanon, Pa.

WANTED—RCA 1847 experimental iconoscope tube in working condition. George W. Field, Rt. 1, Minneapolis 9, Minn.

FOR SALE—Model 162-C Rider's chanalyst, new and in perfect condition. In original carton, $125. R. B. Hodge, Ace Radio Shop, 503 W. Main, Grand Prairie, Tex.

FOR SALE—Superior channel analyzer, hardly ever used. Two 6N6G and one LN5 tube. Also a Brush crystal headphone. Best offer takes all. S. J. Horoman, 143 Manhattan St., Ashley, Pa.

FOR SALE OR TRADE—General Industries automatic record changer and recording unit, in good condition. What am I offered? I need a moderately priced tube and set tester. A good used one that is not too old will do. Bruce Pelzer, 43-11 Ithaca St., Elmhurst, N. Y.

FOR SALE—Special grab bag offer. Over $100 cost of miscellaneous radio parts, etc. Weight about 90 lbs. $30 cash or money order, no C.O.D. shipped prepaid. Also have new Triplett 3212 tube tester. Will trade for any portable tube and set tester in good condition and $20 cash. Also will sell set of radio diagrams. Books, complete sets from 1926 to 1941, $6 cash sent prepaid. Your Radio Doctor, 397 Melrose St., Brooklyn 6, N. Y.

WANTED—BC610 transmitter in good condition. Interested in most reasonable price for cash at once. Write Fred Rudolph, Stryker, Ohio.

NOTICE TO RADIO MEN—I am sincerely thanking all radio men for co-operating with us. I am closing our mail order service. We will no longer issue price lists on tubes or parts. Snyder's Radio Service, P. O. Box 321, Sunbury, Pa.

FOR SALE—Stock of new radio parts and tubes; small but well rounded. List price $160. Your price $95. Please send self-addressed 3c stamped envelope. Jerry Foley, Box 292, Montezuma, Ind.

FOR SALE—20 watt 4 band phone complete with transmitter nearly completed. Also bargains in new receiving, transmitting, and UHF tubes. Want mimeograph, books, ham stuff, etc. Eddie Howell, Route 2, Dillon, S. C.

FOR SALE OR TRADE — Photographic equipment. New BC-223AX and BC-375-E radio transmitters. New BC-348-Q receiver. New Sun-Kraft lamp. Want test equipment; radio, electrical and chemical books; telescope; binoculars. Hansen Radio Service, 165 Silverbrook, Niles, Michigan.

WILL SELL—Globe Trotter, 25 watts fone, 40 cw. Working all bands. Wired by engineer, $90, complete or will trade on Hi Power rig. Fred W. Rudolph, Stryker, Ohio.

FOR SALE—1-79C Clough-Brengle audio oscillator like new, $65. 1 Magnovox 15" high fidelity speaker, 6600 ohm field, 15 ohm v.c., new $32.50. 1 Jensen M-70 speaker, 1 model Q tester with deflectors, 1 model F-7 divider network, $75. Not sold separate. Lots of tubes, high fidelity audio transformers, amplifiers, other parts. Herman McMasters, 1800 So. 26th St., Terre Haute, Ind.

WANTED—Rider's manuals No. 8 to 14. State price. Need not be new. Capt. David Salzman, Union Radio Television Lab., 2 Chester Ct., Brooklyn 25, N. Y.

FOR SALE—75 three inch meters, amateur radio parts of all kinds. The Radio Laboratory, 912 West 151st St., East Chicago, Ill.

FOR SALE OR SWAP—New RCA Victor automobile radio, model 8M3 with head for 1934, 35, 36 Ford and Turner dynamic mike, model 811 with 25' shielded cable. Want cash or VTVM with signal probe. Make offer, all inquiries promtly answered. Vincent F. Carnagie, 187 Clinton St., Brooklyn 2, N. Y.

LEAVING COUNTRY — Sacrifice HQ-120X, DB-20, deluxe kw fone xmtr. with band-switching vfo, to first offer over $750. Sell only complete station .B. N. Gensler, 573 Chester St., Brooklyn 12, N. Y.

FOR SALE OR SWAP—Crystals from 375kc to 541.66kc in intervals of 1.388kc for photographic equipment. Complete list of crystals on request. Marvin Sims, 706 Dearborn, Lawton, Okla.

WANTED—QST. 1942 Sept.; 1943 May, June,; 1945 March, Aug., Sept.; 1946 Jan. Will pay reasonable price. Let me know what you have. J. S. Nichols, Forest Grove, Ore.

WANTED—Some good used 12" Cinaudagraph speakers. 1¼" voice coil or better. Grillo Radio Shop, Milford, Mass.

WANTED—Burned out power transformers or medium or large iron transformer cores, any condition. Send card stating size and what you want. Franklin Nagy, Mary Ella Hall, Kannapolis, N. C.

FOR SALE — Latest complete DeForest's course in Radio, Sound, and Television and Radio Servicing course and Aircraft Radio. Over 110 lessons, cost over $200 6 months ago. Can use Rider's or mfg.'s service manuals. John Raposa, 167 Washington St., Fall River, Mass.

WANTED—A position as radio lab. assistant, or trouble shooter and repairman. One year's training in servicing and repair of radio and television. Can use all types of test instruments. Three years experience in radio repairing. L. Schwartzman, 1785 Bryant Ave., Bronx 60, N. Y.

WANTED—Westinghouse WR-203 or Emerson 34-C or 101, not necessarily working. Will sell Zenith Service Manual, vols. 1 and 2. Radio Sales and Service, 958 Washington Ave., Tyrone, Pa.

WANTED—QST, Radio and IRE Proceedings, also binoculars. Have hi frequency transmitters, etc. H. & H Radio Electronics Service ,250 Livermore Ave., Westerleigh, Staten Island, N. Y.

WANTED—Stancor masterpack, Stancor master deluxe, or A.T.R. "A" battery eliminator. Will pay cash. Albert C. Hart, 4848 Linden Ave., Hammond, Ind.

WANTED—Used HQ-120, SX-25, SX-32 or similar receiver in good condition. For sale or trade S-20-R; SW-3 with power supply and coils; Lear APR-A portable receiver with broadcast and 200-400 kc bands, ac-dc or battery. C. M. Maer, Jr., 51 Hillhouse Ave., New Haven, Conn.

FOR SALE—30 watt P.A. sound system, portable dual speaker, phono equipment, mike, stand, cable and VU meter complete, four channel input, built by ACC. New, price $125. V. Kozma, 3104 Wilkinson Ave., New York 61, N. Y.

FOR SALE—10 volumes Rider's manuals, Nos. 1-10 inclusive, like new. State best offer. O. S. Marder, 1694 Selwyn Ave., Bronx 57, N. Y.

FOR SALE—Brand new nationally advertised $23.95 retail 5 tube white plastic radio, $16.95. Order a sample now. Sheboygan Radio, 2314 N. 15th St., Sheboygan, Wis.

FOR SALE—Motorola custom built radio for 1946 Buick car in sealed carton. Also fits 41-42 Buick, regular price $78.05, first $50 money order gets it. Leading Radio ,and Appliance Co., 158-160 East 3rd St., Mt. Vernon, N. Y.

FOR SALE—RCP 801M tube and set tester. Rider's volume 1 and volume 5. First $50 money order or certified check takes all. Ernest S. Reynolds, 1362 Washington St., So. Braintree 85, Mass.

FOR SALE—75 50LL's new, 50 3525's new, 30% off list. Want used table model telereceiver. State make, model, condition, price and channels covered. The Radio Shack, 1602 W. Pratt St., Baltimore 23, Md.

SWAP—Gembachi Radio Manuals. Want old time 6 volt A-B battery or what have you. Frank Cresswell, 48 College Ave., Tarrytown, N. Y.

FOR SALE OR TRADE—Transmitting tubes and condensers. All kinds of receiver tubes and parts for sale or trade for test equipment, manuals and crystals. Write for list. Johnson Radio Service, Box 224, Greeley, Neb.

FOR SALE OR TRADE—100 12SG7 RCA tubes, new, packed in one large carton box. Make offer. Mike Procyk, 845 N. Rockwell St., Chicago 22, Ill.

FOR SALE—Brand new radio tubes, 45-50% off list. I have all types. Send for list. All letters answered. David Rudolph, 45 Argyle Rd., Brooklyn 18, N .Y.

FOR SALE—Amateur's call letters, wire pins, gold rolled plate wire, fit in lapel, 75 cents a set. Order now. Jayel Enterprise Co., 212 Grand St., Brooklyn 11, New York.

WANTED—British serviceman much interested in American radio would be pleased to purchase any mags, books, courses, catalogues or servicing manuals relating to same. Also any mags, etc., on mechanics, hobbies, or model railroads. Willing to purchase any number. Please state your prices including post. L. Marks, 14 Avenue Rd., Kingston, Surrey, England.

FOR SALE—Brand new General Electric 2" meter, 0-1 R.F. ammeter, postpaid, $3.50. J. Goldstein, 151-09 34th Ave., Flushing, Long Island, N. Y.

WANTED—12 volt 12 amp. dc battery charger or power supply with a 110 volt ac input. R. L. Bruce, 1171 Union St., Manchester, N. H.

FOR SALE—RK-60 rectifier tubes, similar to 5Z3 but 750V, at 36 cents each, $24 hundred. Lectronic Research Laboratories, Howell and Hegerman St., Philadelphia 24, Pa.

SELL OR SWAP—Super-pro and other communications receivers and equipment. Want test equipment, oscilloscope, "ham" gear. Dory's Radio Service, 1859 62 St., Brooklyn 4, N. Y.

SELL OR SWAP—I have a Webber tube tester with modernizing panel No. 33 for $5; also a precision series 832-A multi-range tester with simplified rotary 31 range selection at $15; or would trade for a small 5 tube radio. Seffker Electric, Box 404, Arnold, Neb.

FOR SALE—Nine Rider's manuals, Nos. 3, 6, 7, 8, 9, 10, 11, 12, 13, condition like new, price $90 F.O.B. El. Grimshaw 174 Water St., No. Andover, Mass.

FOR SALE—Rubber stamps, 3 line cushion mounted index face, made-to-order for 70 cents. Stamps must not be over 2" long. Prices on stamps over 2" furnished for 3 cent stamp. J. T. Cookson, Box O, Puxico, Mo.

WANTED—500 mil filter choke made by Stancor for BC-610. Sell Thordarson swinging choke T19C37 and smoothing choke T19C44, 400 ma, $13 pair. Samuel C. Macy, Eupedon Farm, Clarksville, Tennessee.

FOR SALE—Sound equipment. Write for list today. B and B Sound Systems Co., 1334 Marie Ct., Sheboygan, Wis.

SWAP—Jap rifle for Rider's manuals. Make offer. John Polyakovics, 393 E. 168 St., New York 56, N. Y.

FOR SALE—Sam's Fotofact folders, sets 1, 2, 3, 4. Best offer takes them. J. P. Epps, Box 409, Lawrence, Kan.

FOR SALE—Used copies Radio Craft, Feb. 1941, July, Aug., Sept., 1944; June, 1946, 25 cents each. H. Nickerson, 201 Devonshire St., Boston, Mass.

FOR SALE—Generators, brand new 200 amp., 28 volt dc, 5700 watt Air Corps type, P1, 6 pole, shunt wound, ball bearing, constant duty, shipped in original containers. These generators were made for use in the B-29. Cost the Government several hundreds of dollars. Now only $49.50. Charles Wasicka, 4726 So. Packard Ave., Cudahy, Wis.

WANTED—Short wave receivers, moderately priced, good condition, civilian or surplus model. Write full details. Jerry Reichstein, 2824 Morris Ave., Bronx 58, N. Y.

FOR SALE—All types of tubes available. Send us your needs and we will ship same day order is received. We also have a complete line of parts, speakers, and 5 tube ac-dc sets. Write, phone or wire. Don't delay. Academy Radio, 1901 Mott Ave., Far Rockaway, N. Y.

FOR SALE—Dumont model 274 5" oscilloscope complete, Supreme 599A combination tube and set tester, RCP model 705 signal generator, all wave and very accurate. All above like new and in perfect condition. Want Rider's manuals and Philco, RCA manuals. John Raposa, Jr., 167 Washington St., Fall River, Mass.

FOR SALE—Microphones, new, dynamic low imp., with switch in handles, $5. Ear prones, new dynamic low imp., with ear cushion, $5. Ear phones, various types including army, $1.50. Ear phone rubbler cushions. 50 cents. Alfred Livingston, 12-01 Ellis Ave., Fair Lawn, New Jersey.

WANTED—A used tube condenser tester. Will pay cash or trade you what you need. G. E. E., Lock Box 18, Geneva, Minnesota.

FOR SALE OR SWAP—1 Solar capacitor analyzer, type CC-1-60. Good condition. Cash or what have you in test equipment. Edward Talisse, 187 Clinton St., Brooklyn 2, N. Y.

FOR SALE—Scarce tubes, up to 60% off list. Brand new, guaranteed, standard brands. Write for free catalog. Commercial Radio, 36 Brattle St., Boston 8, Mass.

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